Fig. 1 shows a thin film transistor substrate for a conventional liquid crystal display (LCD). The LCD includes thin film transistors 6 positioned at intersections between data lines 2 and gate lines 4, and pixel electrodes 14 connected to drain electrodes 12 of the thin film transistors 6. The thin film transistor 6 is provided at an intersection between the data line 2 and the gate line 4. The thin film transistor 6 has a gate electrode 10 connected to the gate line 4, a source electrode 8 connected to the data line 2, and a drain electrode 12 connected, via a first contact hole 16, to the pixel electrode 14.

The thin film transistor 6 further includes a semiconductor layer (not shown) for providing a conductive channel between the source electrode 8 and the drain electrode 12 by a gate voltage applied to the gate electrode 10. The thin film transistor 6 responds to a gate signal from the gate line 4 to selectively apply a data signal from the data line 2 to the pixel electrode 14. The pixel electrode 14 is positioned at a cell area divided by the data line 2 and the gate line 4, and is made from an indium tin oxide (ITO) material having high light-transmissivity. The pixel electrode 14 generates a potential difference from a common transparent electrode (not shown) provided at an upper glass substrate by a data signal applied via the first contact hole 16.

By virtue of this potential difference, a liquid crystal positioned between the thin film transistor substrate and the upper substrate is rotated according to its dielectric anisotropic property and a light applied, via the pixel electrode 14, from a light source is transmitted into the upper glass substrate.

A storage capacitor 18 provided between the pixel electrode 14 and the gate line 4 at the previous stage plays a role in preventing voltage variation in the pixel electrode 14 by charging a voltage in a period at which a gate high voltage is applied to the previous-stage gate line 4 and discharging the charged voltage in a period at which a data signal is applied to the pixel electrode 14. Since, as stated, the storage capacitor 18 aims at maintaining a stable pixel voltage , it must have a high capacitance value. To this end, the storage capacitor 18 has a structure as shown in Fig. 2.

In Fig. 2, the storage capacitor 18 is defined by a storage electrode 20 electrically connected, via a second contact hole 22 formed in a protective film 28, to the pixel electrode 14 and a gate electrode 4 having on a gate insulating layer 26 therebetween. The storage electrode 20 is formed on the gate insulating layer 26 upon formation of the data line 2 and the source/drain electrodes 8 and 12. As a liquid crystal panel goes into a larger dimension,

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the capacitance value of the storage capacitor 18 must be increased. However, the above-mentioned LCD structure is limited in its ability to enlarge the capacitance of the storage capacitor 18.

Please **rewrite the paragraph beginning on page 3, line 21,** and **ending on page 4, line 1,** as follows:

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The protective film 28 of the thin film transistor substrate is usually made from an inorganic material having a dielectric constant such SiN_X or SiO_X . The pixel electrode 14 and the data line 2 having such an inorganic protective film therebetween maintain a certain horizontal distance d (e.g., 3 to 5μm), as shown in Fig. 3, so as to minimize any coupling effect caused by a parasitic capacitor. In this case, in order to shut off light leaking through the space between the data line 2 and the pixel electrode 14, a black matrix formed on the upper substrate has a width sufficient to cover a portion of the pixel electrode 14 positioned at each side of the data line 2. As a result, the aperture ratio of the liquid crystal cell is inevitably reduced.

Please **rewrite the paragraph beginning on page 4, line 9,** as follows:

A further object of the present invention is to provide a liquid crystal display that is capable of reducing the width of a black matrix to increase an aperture ratio, as well as to allow for repairs upon breakage of a data line.

Please **rewrite the paragraph beginning on page 4, line 14**, as follows:

In order to achieve these and other objects of the invention, a thin film transistor substrate in a liquid crystal display according to the present invention includes a gate dummy pattern formed so as to extend vertically from the gate line and to overlap with the data line and the pixel electrode.

Please **rewrite the paragraph beginning on page 4, line 27**, as follows:

Fig. 1 is a plan view showing a structure of a thin film transistor substrate in a conventional liquid crystal display;

Please **rewrite the paragraph beginning on page 4, line 30**, as follows:

Fig. 2 is a sectional view of a portion of the storage capacitor taken along line A-A' in Fig. 1;

5 Cont'd

Please **rewrite the paragraph beginning on page 4, line 32,** as follows:

Fig. 3 is a sectional view of a portion of the data line taken along line B-B' in Fig. 1;

Please **rewrite the paragraph beginning on page 5, line 4,** as follows:

Fig. 5 is a sectional view of a portion of the data line taken along line A-A' line in Fig. 4;

Please **rewrite the paragraph beginning on page 5, line 7,** and **ending on page 7, line 21,** to divide the text into six paragraphs as follows:

Referring to Fig. 4, there is shown a thin film transistor substrate in a liquid crystal display (LCD) according to a first embodiment of the present invention. The LCD includes thin film transistors 6 positioned at intersections between data lines 2 and gate lines 4, pixel electrodes 14 connected to drain electrodes 12 of the thin film transistors 6, and gate dummy patterns 30 overlapping the data lines 2 and the pixel electrodes 14 adjacent to the data lines 2. The thin film transistor 6 has a gate electrode 10 connected to the gate line 4, a source electrode 8

connected to the data line 2, a drain electrode 12 connected, via a first contact hole 16, to the pixel electrode 14, and a semiconductor layer (not shown) for providing a conductive channel between the source electrode 8 and the drain electrode 12 by virtue of a gate voltage applied to the gate electrode 10.

Such a thin film transistor 6 responds to a gate signal from the gate line 4 to selectively apply a data signal from the data line 2 to the pixel electrode 14. The pixel electrode 14 generates a potential difference from a common transparent electrode (not shown) provided at an upper glass substrate by a data signal applied via the first contact hole 16. By virtue of this potential difference, a liquid crystal positioned between the thin film transistor substrate and the upper substrate is rotated according to its dielectric anisotropic property and a light applied, via the pixel electrode 14, from a light source is transmitted into the upper glass substrate.

A storage capacitor 18 provided between the pixel electrode 14 and the gate line 4 at the previous stage plays a role in preventing voltage variation in the pixel electrode 14 by charging a voltage in a period at which a gate high voltage is applied to the previous-stage gate line 4 and discharging the charged voltage in a period at which a data signal is applied to the pixel

electrode 14. The storage capacitor 18 is defined by a storage electrode 20 electrically connected, via a second contact hole 22 formed in a protective film 28, to the pixel electrode 14 and a gate electrode 4 having a gate insulating layer 26 therebetween. The storage electrode 20 is formed on the gate insulating layer 26 upon formation of the data line 2 and the source/drain electrodes 8 and 12.

The gate dummy pattern 30 overlaps with the data line 2 and the adjacent pixel electrode 14 to serve as a black matrix, as well as to allow for repairs upon breakage of the data line. For instance, the gate dummy pattern 30 is electrically connected to a broken data line 2 using a laser welding technique upon breakage of the data line 2 to permit a repair. Also, the gate dummy pattern 30 is positioned so as to overlap, by about 0.5 to 1μm, the data line 2 and the pixel electrode 14, thereby serving as a black matrix to shut off light leaking between the data line 2 and the pixel electrode 14.

When the gate dummy pattern 30 is used as a black matrix , an area overlapping the pixel electrode 14 can be further reduced in comparison to conventional black matrices to provide an increase in the aperture ratio of about 5 to 6%. To this end, the gate pattern 30 is formed on a lower substrate 24 with the gate

insulating layer 26 at each side of the data line 2, as shown in Fig. 5. The gate dummy pattern is made from the same material (e.g., Al, Mo, Ti, W, Cr or Cu) as the gate line and the gate electrode. The above-described gate dummy pattern 30 may be provided at both sides of the data line 2 or at one side of the data line 2.

If the gate dummy pattern 30 is electrically connected to the gate line 4, it can be used as a storage electrode forming, along with the pixel electrode 14, the storage capacitor , overlapped with having the gate insulating layer 26 and the protective film 28 therebetween. In this case, the capacitance value of the storage capacitor caused by the gate dummy pattern 30 is added to the conventional storage capacitor 18, so that the voltage of the pixel electrode 14 can be maintained at a more stable state.

Please **rewrite the paragraph beginning on page 7, line 23,** and **ending on page 8, line 31,** to divide the text into multiple paragraphs as follows:

Fig. 6 shows a thin film transistor substrate in a liquid crystal display (LCD) according to a second embodiment of the present invention. The thin film transistor substrate of Fig. 6 has the same elements as that of Fig. 4, except that the gate

dummy pattern 32 is electrically connected to the gate line 4. The gate dummy pattern 32 is extended from the gate line 4 into a lower portion thereof so as to overlap the data line 2 and the pixel electrode 14 at each side of the data line 2. In this embodiment, the gate dummy pattern 32, along with the pixel electrode 14, defines a second storage capacitor overlapped with a gate insulating layer and a protective film. As a result, the capacitance value of the second storage capacitor caused by the gate dummy pattern 32 is added to the existing storage capacitor, that is, the first storage capacitor 18, so that the voltage at the pixel electrode 14 is more stable . In addition, the gate dummy pattern 32 allows for repairs upon breakage of the data line 2.

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In order to effect repairs of the data line 2, it must be opened to the gate line 4. However, when the gate line 4 and the gate dummy pattern 32 are cut by means of a laser, the data line 2 overlapping with the gate dummy pattern 32 is also cut away. In order to prevent damage to the data line 2, a recess 32a is provided at a cutting part for breaking the gate line 4 and the gate dummy pattern 32 so as to not overlap the data line 2, as shown in Fig. 6. Accordingly, if the data line 2 breaks, repairs can be effected by cutting the recess 32a provided in the gate

dummy pattern 32 using a laser to electrically separate the gate line 4 from the gate dummy pattern 32 and thereafter electrically connecting the broken data line 2 to the gate dummy pattern 32 by laser welding . The gate dummy pattern 32 is positioned so as to overlap, by about 0.5 to 1 μm, the data line 2 and the pixel electrode 14, thereby serving as a black matrix shut off a light leaking between the data line 2 and the pixel electrode 14. When the gate dummy pattern 32 is used as a black matrix as described above, the area overlapping the pixel electrode 14 can be further reduced in comparison to conventional black matrices to provide an aperture ratio increase of about 5 to 6%.

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Please **rewrite the paragraph beginning on page 8, line 32,** and **ending on page 10, line 23,** as follows:

Referring to Fig. 7, there is shown a thin film transistor substrate in a liquid crystal display (LCD) according to a third embodiment of the present invention. The thin film transistor substrate of Fig. 7 has the same elements as that of Fig. 4, except that a protrusion 2a is provided at the data line 2 so as to shut off any light leaking between the gate line 4 and the gate dummy pattern 30. The gate dummy pattern 30 formed at the same layer as the gate line 4 overlaps with a data line 2 and a pixel

electrode 14 at each side of the data line 2 to serve as a black matrix for shutting off a light leaked between the data line 2 and the pixel electrode 14. In this case, in order to prevent a light from being leaked through a spaced area 34 between the gate line 4 and the gate dummy pattern 30, the data line 2 further includes a protrusion 2a overlapping with the gate line 4 and the gate dummy pattern 30. When the gate dummy pattern 30 and the protrusion 2a of the data line 2 are used as a black matrix as mentioned above, an area overlapping with the pixel electrode 14 can be more reduced in comparison to the conventional black matrix to provide an aperture ratio increase of about 5 to 6%. Also, the gate dummy pattern 30 permits a repair upon break of the data line 2. More specifically, the gate dummy pattern 30 is electrically connected to a broken data line 2 by the laser welding technique, etc. upon break of the data line 2 to permit a repair.

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If the gate dummy pattern 30 is electrically connected to the gate line 4, then it can be used as a storage electrode forming the storage capacitor along with the pixel electrode 14 overlapped with having the gate insulating layer 26 and the protective film 28 therebetween. In this case, a capacitance value of the storage capacitor caused by the gate dummy pattern 30 is added to the

conventional storage capacitor 18, so that a voltage of the pixel electrode 14 can be maintained at more stable state.

Please **rewrite the paragraph beginning on page 10, line 3**, as follows:

As described above, according to the present invention, the gate dummy pattern branched from the gate line and overlapping with the edge of the pixel serves as a storage electrode to increase a storage capacitance value. Accordingly, since a storage capacitance value increased by virtue of the gate dummy pattern compensates for an average maintenance voltage Vrms between the pixels generated by a characteristic difference between the thin film transistors caused by a misalignment of the line patterns in the course of a process to improve a picture quality, the present LCD is adaptive for a technique of fabricating a large-dimension LCD. Furthermore, according to the present invention, the gate dummy pattern branched from the gate line and overlapping with the edge of the pixel serves as a black matrix to further increase an aperture ratio in comparison to a case where the conventional black matrix is used. In addition, the gate dummy pattern branched from the gate line and overlapping with the edge of the pixel is used